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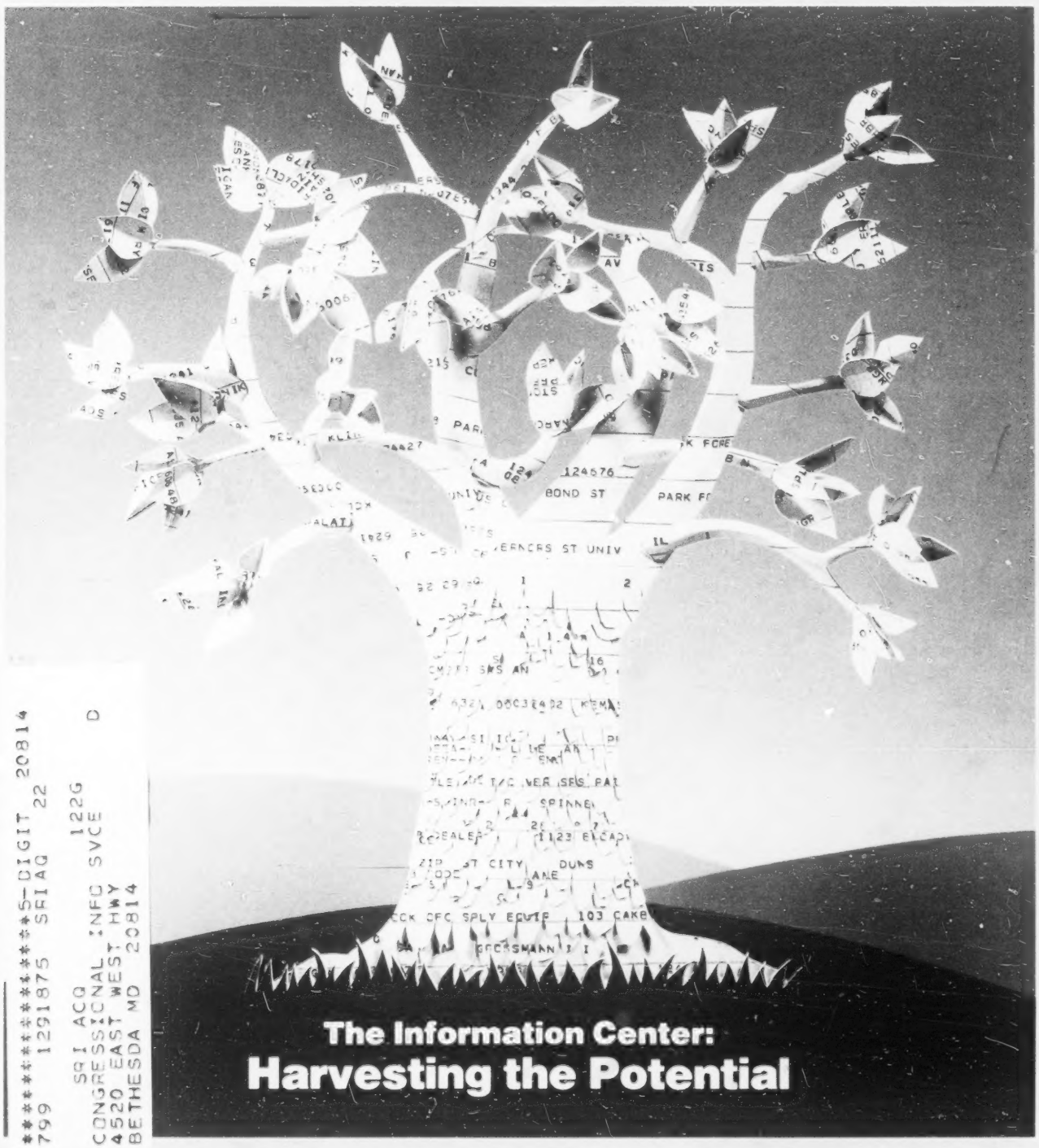
Testing Application Software



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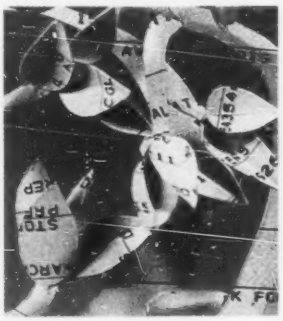
INFOSYSTEMS
THE MAGAZINE FOR INFORMATION SYSTEMS MANAGEMENT

ISSN 0364-5533

November 1985 Volume 32 Number 11



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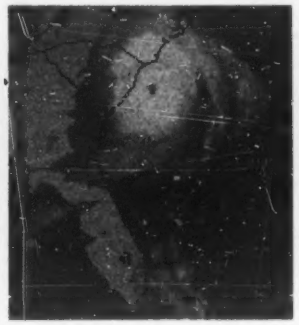

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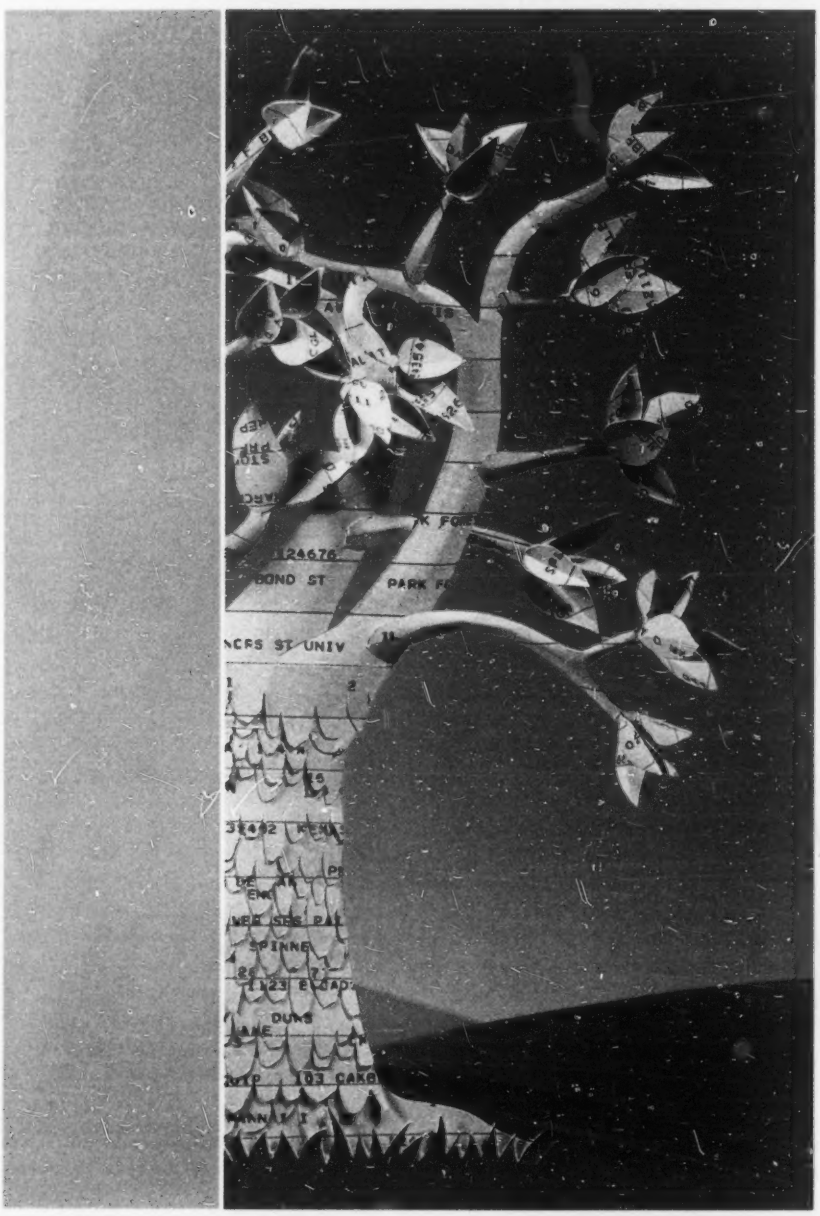
The Information Center: HARVESTING THE POTENTIAL

Expectations of what an information center can accomplish vary with audience, staffing of the center, and software and hardware tools available.



By Wayne L. Rhodes Jr.
Editor & Publisher

Since its introduction nearly a decade ago, the concept of the information center has been put forth repeatedly as a possible solution to some of the problems related with corporate computing. Among these problems, of course, were the applications backlog of data processing (DP) departments and the computer illiteracy of non-DP professionals. The concept itself was infrequently tested, however, until the personal computer (PC) and a spreadsheet program known as VisiCalc came together. Their marriage and the subsequent birth of many end-user computer products quickly boosted the information center from concept to reality.

According to some recent surveys, the information center has barely reached adolescence in most organizations, although almost everyone seems to have one now. The surveys found that expectations of what an information center can accomplish vary with audience, staffing of the center, and available software and hardware tools.

This article looks at the state of the information center in 1985, analyzing its role as a vehicle for harvesting the potential computers bring to organizations. There is some speculation on what this promising adolescent might grow to become. The most popular hardware and software products will be looked at, along with how some of these are being employed.

A feel for the dynamism of the information center in practice may be drawn from the Second Crwth Information Center Survey. According to Crwth's Bibi Garcia, while the first survey elicited responses from 169 organizations, the second survey attracted the partici-

pation of 1,080 companies. A recent report by the American Management Assn. concluded that 80 percent of billion-dollar companies had information centers; one-third of them were established within the past year. The Diebold Group, a New York City-based management consulting firm, reported that at the end of 1984, 80 percent of respondents to its survey had information centers. This contrasts to only 67 percent a year earlier.

But these information centers are not yet firmly rooted in the organizations that have established them. According to *Information Center* magazine, a lot of people are working with the DP equivalent of hand-me-downs. "The information center might have a great deal of purchasing authority [either explicit or de facto] where micros or software are concerned," reports Editor Floyd Kemske, "but when it comes to the big machines, it has as much influence as you would expect a young, barely established department to have." Kemske points out that although every organization comes by its machinery in its own way, there is a common denominator: "The information center is never first in line for money or memory."

Research conducted this summer by Hitchcock Research Services on behalf of INFOSYSTEMS further underscored the fledgling nature of the information center in organizations. Over 45 percent of those surveyed said that microcomputers are used as standalone processors, neither communicating with each other nor with a mainframe computer. Just under 10 percent said they had micros communicating with each other.

This contrasts dramatically with the opinion respondents have of where the information center will be in five years. Nearly 90 percent said they believe their information centers will have mainframe and microcomputers communicating. None believe they will have standalone, noncommunicating microcomputers as their primary mode of operation in five years.

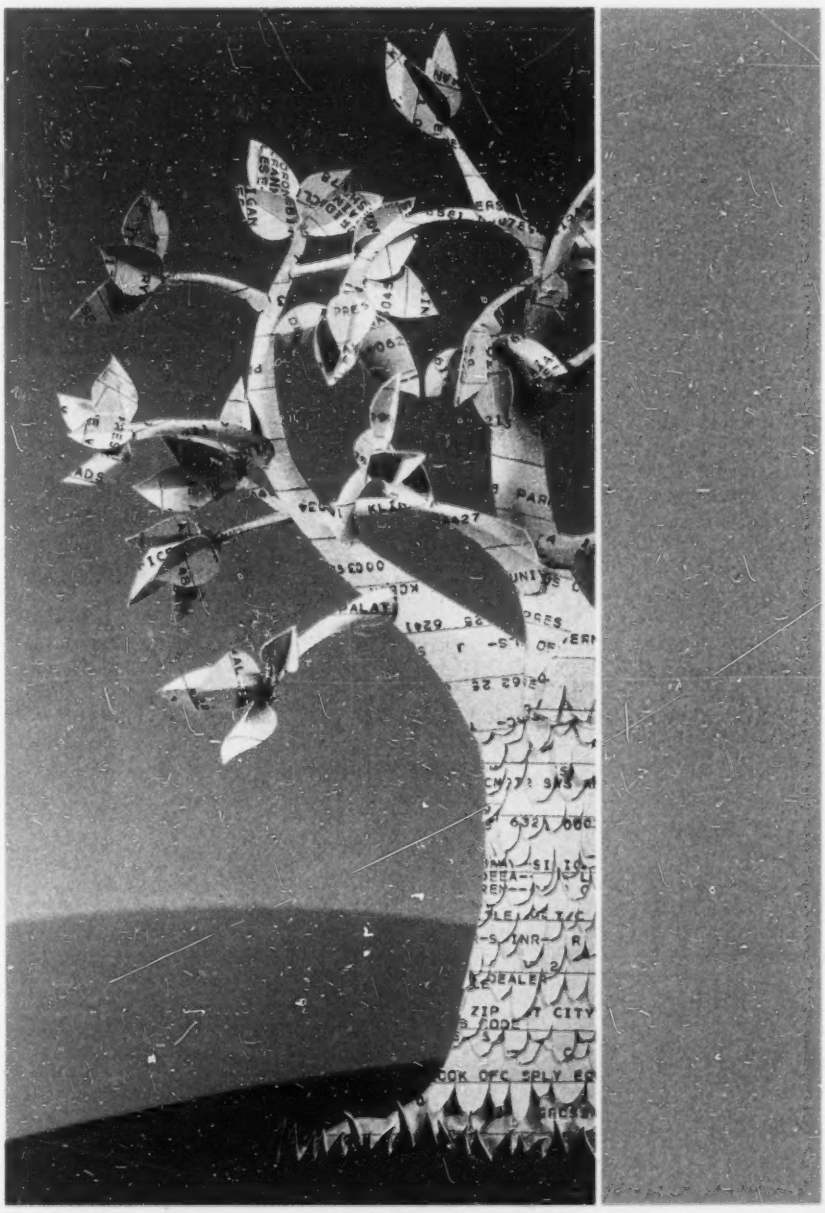
Virtually all the research says the primary purpose of the information center is to educate the computer illiterate. "When end users can process routine information efficiently, the first goal of the information center is realized," Garcia says. "But basic information processing is just the first step. The next step is for end users to utilize the information for decision making." To harvest the potential, in other words.

While DP backlog was cited as one impetus to instituting an information center, Crwth's survey revealed that few organizations have actually experienced a reduction. "The information center is generally credited for reducing the 'invisible backlog'—that is, the jobs that are never even submitted to the data processing department due to the anticipated delay," Garcia says.

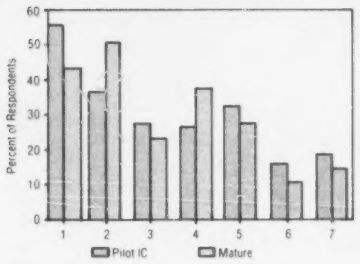
The information center is typically set up as a department under the director of management information systems (MIS), according to Crwth. The second most common arrangement has it reporting to the manager of systems and planning. Crwth believes this arrangement helps to dissipate hostility while encouraging a cooperative atmosphere between information center staff and systems personnel. Ironically, one of the benefits Crwth cited for the information center is that end users appreciate DP's role in the company and its contribution to their jobs.

Computer Intelligence Corp. (CIC) reports similar findings to those of Crwth. The market research firm surveyed 370 architecture (IBM/PCM mainframe) information center managers. CIC says it was not surprised to learn that most information centers (86 percent) report to the data processing organization. Because all MIS notations (11 percent of the total) were write-in responses, CIC claims that there is some confusion in terminology. A more detailed examination of this phenomenon did not uncover any pattern to respondents' notation of MIS instead of opting for the DP answer provided.

CIC finds that a wide variety of users have access to the information center. Ninety-five percent of the respondents

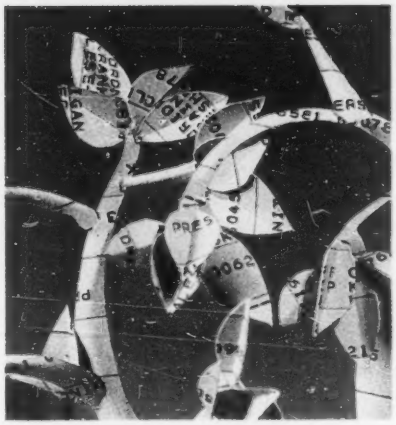


Information Center Obstacles

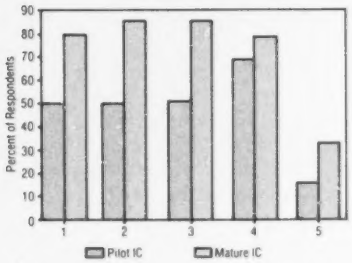


Key
1. Lack of end user awareness
2. Shortage of DP trainers
3. DP resistance
4. Management resistance
5. CPU shortage
6. Insufficient DASD space
7. Lack of chargeback system

Source: The Second Crwth Info Center Survey



Information Center Benefits



Key
1. Improved computer literacy
2. Increased job productivity
3. Improved use of information
4. Improved DP/end user relations
5. Reduction of DP backlog

Source: The Second Crwth Info Center Survey

stated that business (corporate) management or staff professionals were served by the center. A majority of the sites also noted suppport of clerical staff (70 percent) and DP staff (66 percent). The other category included sales or marketing staff, remote offices and, in a few instances, support of student populations in educational environments.

Successful implementation of an information center is not easy. Crwth says the foremost obstacle is a lack of DP trainers. "During the pilot stage, the high teacher-to-student ratio tends to obscure this problem," Garcia explains. "But of the more mature information centers, over half judged the trainer shortage to pose a serious threat."

The breadth and diversity of information-center-oriented products further aggravates the training issue, according to Crwth. For instance, Crwth lists 22 different mainframe products that have had some success in penetrating information centers, and names eight microcomputer products as leaders.

"Each package, such as SAS, will be used very differently by each end user," Garcia points out. "For example, a clerk may use it for word processing, an engineer for statistical studies, and a business analyst for graphic presentations. None will want to learn the entire package.

"The training dilemma is further aggravated by the fact that these tools are often as new to experienced DP professionals as they are to novice end users."

INFOSYSTEMS asked what functions were necessary to support end-user computing through an information center. Crwth asked what services were necessary. Between the two sets of research, you get a pretty clear idea of how comprehensive the concept has become even in its infancy.

Besides training, the most frequently mentioned support services included providing access to mainframe-based data files, graphics facilities and fourth-generation language programming; analyzing end-user requirements; demonstrating hardware and software; and providing a hotline for end users.

As far as the types of hardware in use, respondents to the INFOSYSTEMS survey were heavy users of IBM or compatible microcomputers; 53 percent said a minicomputer was involved and over 40 percent mentioned an IBM mainframe. Over a quarter of the respondents said they have non-IBM-compatible microcomputers while just under a quarter of them said non-IBM mainframes are involved. Nearly 90 percent said their information center is or will be handled by existing corporate mainframes, and 71 percent said they would not require an operating system that is different from the one used in daily DP functions.

The top eight microcomputer software products in use, according to Crwth's research, are the following: Lotus Development's 1-2-3 and Symphony; Ashton-Tate's dBase II and III, and Framework; Micropro's Wordstar; and VisiCorp's VisiCalc.

The leading mainframe-oriented software products, again as reported by Crwth, are: IBM's ADRS II, ISPF, CMS, GDDM, JCL, PROFS, APL/DI, QBE, Information Center 1 and AS; Pansophic Systems' Easytrieve Plus; Evaluation & Planning Systems' FCS; Martin Marietta's Ramis; Informatics' Answer/DB; Execucom's IFPS; ISSCo's Tell-A-Graf; Information Builders' Focus; Infodata's Inquire; D&B Computing's Nomad; and SAS Institute's SAS, SAS/FSP, SAS/Graph and SAS/OR. (IN)

For more information on the 1985 Crwth Information Center Survey, enter No. 136 on the Reader Information Card.

Software: MAKING THE INFO CENTER TICK

By Jan Snyders
Senior Editor

The information center is conceived of in three different ways: as a centralized room for computing, as a departmental computing environment, and simply as a system used by company employees. Regardless of how it is set up, there is a wide variety of software available for running the information center. Since the software runs on both mainframes and minicomputers, use of a data base management system (DBMS) and/or micro-to-mainframe software will usually be required.

As a rule, the information center as a centralized computing room is used mostly for training. Some companies, however, set up an information center as an alternative to putting individual terminals or personal computers (PCs) on every worker's desk. Instead, employees can go to the center to develop reports and spreadsheets, and to do word processing.

Let's look at information center software individually. The report writer has been referred to as a fourth-generation

language, a data base management system and an information center aid. Under any circumstance, report writers are designed for ease of use by non-data-processing personnel. These packages, which allow data to be retrieved from the central processor, relieve programmers of developing one-time reports for users.

A report-producing program can be executed at a terminal in a few minutes by a user with little experience. Some report writers are dictionary-based, with technical information about the data contained in the dictionary. Based on the contents of the dictionary, the system formats and validates data automatically. Most report writers use tutorials which reduce the need for the user to understand the data base, dictionary and so on. Many of the systems are menu-driven, enabling information to be selected and summarized directly from the data base.

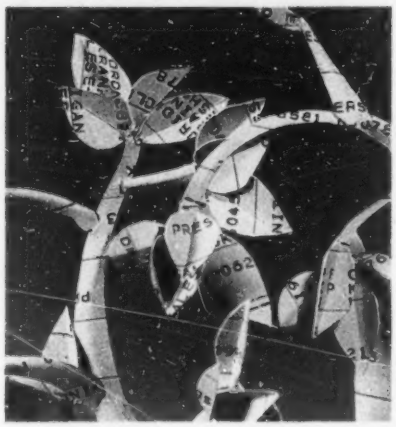
Spreadsheets on the mainframe became popular with the introduction of the PC. Most spreadsheet packages provide computerized assistance in planning, forecasting, budgeting and data analysis. Split-screen capabilities allow users to work with multiple segments of the worksheet simultaneously. In the information center, spreadsheet programs should enable users to combine data from several departments into corporate reports. Some packages support PC files, allowing the mainframe to load and save micro-generated spreadsheets.

Word-processing software is usually found in a specified word-processing center. Many companies install word processors in an information center for use by secretaries with complex formatting requirements or managers who need to complete letters with multiple revisions. The major features of word processors are that information can be added, deleted and moved without retyping an entire document.

With most packages, the user specifies the type of document (such as business letter, personal letter, memo, report or envelope) and the system automatically adjusts margins, vertical spacing, justification, tabbing, document length and printing style.

When the information center is in a departmental context, it includes all the types of software discussed above, but usually also will include application generators, decision-support packages and graphics. There is also a greater emphasis on security. Specific applications software is also included for accounting, personnel and human resource management.

Although many application generators are designed for people with some programming knowledge, there are several for use by the inexperienced. Application

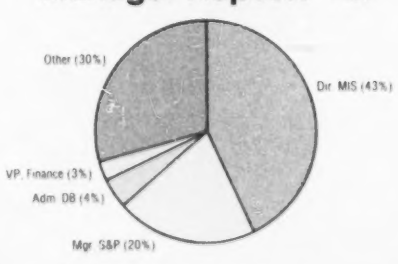


generators can create complete applications for all areas of business. Guidance from a systems analyst is usually required. In the information center environment, these packages should be menu-driven, fill-in-the-blank systems providing on-line query and update functions in English-like language. Some of the functions of an application generator are describing a file and data record, screen formatting, editing of attributes, and the creation of menus and user documentation screens. When choosing an application generator, take into consideration whether it will be used by a systems analyst or end user.

Of all the management tools used in the information center, decision-support systems are the most common. These systems make managers' jobs easier. They are used for analysis of sales, cost and profits, budgets, and forecast modeling. With them, "what-if" questions can be answered. While there are many vendors providing decision-support software, it is necessary to determine whether a system works alone or requires a DBMS, data dictionary, report writer and so on, before it is used.

Hand in hand with decision-support systems is graphics. Managers no longer want to peruse rows and rows of figures to make a decision. Graphic presentation is much more convenient. Data can be shown in pie, bar or line charts that can

Information Center Manager Reports To:



Source: The Second Crwth Info Center Survey

be scanned easily. These can be intermixed on a single form. One of the major benefits of using graphics is that they are noticed.

In the departmental information center, users are now able to enter data in specific categories such as accounting, finance, personnel and manufacturing. Software packages are designed for these departments for ease of use by clerical workers as well as management. However, this presents a major security problem. The more users have access to data, the tighter security must be.

Most software security packages require an administrator. A typical user profile might include details of applications the user can access, statements allowed in the programs and systems commands that can be executed. An application profile might include specific times the application can be executed, initial transaction invoked when a user logs onto the application, and a list of the users allowed to access it. Each terminal can also have a security code.

The primary theory behind the information center is that users throughout the company will have access to all data. Managers are realizing that data is not something that belongs to the data processing department alone. It is a resource to be used by all.

No information center can operate without a DBMS, micro-to-mainframe software and fourth-generation languages. A DBMS integrates data files into a data base and provides different views to different users. Because data is defined independently of any of the application programs, there is a layer of insulation between programs and the data itself. Data can't be changed without affecting a program. The DBMS also provides multiuser support so that multiple users can get at the same data at the same time.

Relational DBMSs provide automatic navigation through the data base. That means that one can specify what one wants without knowing how it is obtained. Relational DBMSs also have a very high-level language capability. Retrieval, update, insert and delete capabilities are provided.

A DBMS consists of several major components: a data manipulation language, a data description language, query and report generators, an applications programming language (which is part of the data manipulation language), and a data communications interface as well as physical implementation and utilities. The data description language explains the structure of the DBMS and how it will look. The data manipulation language is used in writing applications.

While the DBMS's function is to provide language, space management and

data organization, above that is a larger umbrella: the data dictionary. Since the DBMS stores so much data, a data dictionary is usually essential. The dictionary is useful in the operation and control of the information system and in the design of new applications where users need access to data.

DBMS integration is now considered to be very important. Since problem-solving in most organizations cuts across many functional links, data must be shared. Since it is rare that any business function is self-contained and independent of others, it is important that data be standardized, consistent and stored in one repository.

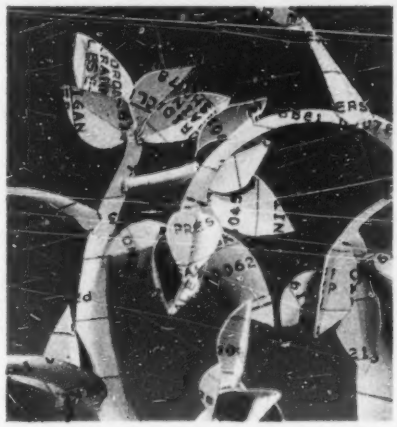
To use the data in the DBMS in the information center, a micro/mainframe connection is almost always necessary. Today there are three types of micro/mainframe software connections. First, users can get information from the computer, manipulate it on their PCs and use the results for their own benefit. The second type of connection allows users to call in information from the mainframe, make changes and then send it back to the mainframe. Changes are held in a "bucket" and made in a batch mode later in the day. Finally, with an on-line, real-time connection, users are in direct communication with the mainframe.

Most data processing (DP) staff are nervous about PC users having direct on-line access. Others, however, believe it is a way to get end users "off their back" since they become self-sufficient in terms of information retrieval. Still others want users to go beyond information retrieval and actually define their application requirements.

There are two ways to design a micro/mainframe system: from the standpoint of the end user who wants to access data, and from the standpoint of the management information systems director or DP manager—perhaps the most logical method. Although DP managers want to make the system easy for end users, they are concerned about security, controls and data integrity. An important requirement is that a system be generic. That is, programs such as VisiCalc, Lotus 1-2-3, dBase II and Symphony should be able to be downloaded without requiring different links. Making sure all users have the same data is another concern.

Along with the DBMS and micro/mainframe software, it is necessary to have user-friendly software, currently referred to as fourth-generation languages (4GLs).

The whole approach of 4GLs is to get closer to users, allowing them to program or talk to the computer in terms of what they want. It is, however, advantageous to have a language that can also be

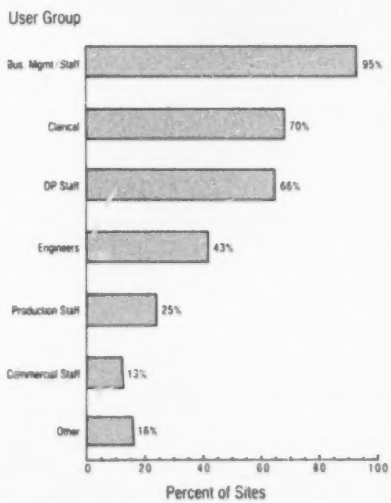


used by programmers to develop complete applications.

Most 4GLs can be categorized according to whether they were developed by a DBMS or non-DBMS vendor; whether they are formal or informal, procedural or nonprocedural, batch or on-line; and whether they are for use by professional or nonprofessional users.

There are basically two camps of 4GL suppliers: those that offer products that serve as a primary data base for managing corporate data and those that do not. Companies such as ADR, Princeton, NJ; Cullinet, Westwood, MA; Cincom, Cincinnati, OH; and Software AG, Reston, VA, offer primary data base products. Other products such as Focus from Information Builders, New York City; Ramis II from Martin Marietta, Princeton, NJ; and Nomad 2 from D & B Computing, Wilton, CT, are not recognized as primary data base products be-

Type of Users Served by Info Center



Source: Computer Intelligence Corp. Info. Center Survey

cause organizations don't use them to manage corporate data. Instead, these companies have developed languages that allow the products to support other data base systems. The main thrust of the non-DBMS vendor is toward the information center. The 4GLs from DBMS vendors, on the other hand, are targeted more for mainstream application development by DP staff.

The idea of DBMS vendor vs. non-DBMS vendor gets a bit more complex if you break the languages into formal and informal. Basically, the older 4GLs seem to be more informal and nonprocedural. Users can get a lot of processing done just by coding one or two lines. These languages tend to be a bit cryptic and subject to shorthand ways of doing things. Although designed for limited types of work, they do it very fast and powerfully and allow less naive end users to do some data processing on their own. Almost all non-DBMS vendors provide informal languages.

There are many other tools provided to increase the productivity of the information center. Some companies have specifically combined a number of products into information center packages. ADR's system includes Dataquery and Datareporter for ad hoc queries and reports; Empire for decision support; Email and ETC for office automation; Ideal for application development; and Roscoe/ETSO for application support.

Cincom's TIS/XA provides a relational DBMS, 4GL application development, business control manufacturing and financial applications, decision support tools, and network management. Computer Corp. of America, Cambridge, MA, combines Access/204, a language-free decision-support query and writing system; PC/204, a micro-to-mainframe link that downloads corporate data for automatic spreadsheet definition and creation on IBM PCs; and Developer, a personal data base manager.

SAS Institute, Cary, NC, combines its base SAS software, an all-purpose data management, analysis and report writing tool; SAS/FSP, an information processing system that gives full-screen interactive data entry; SAS/AF, an interactive facility with menus and screens for application development; SAS/Graph for color graphics; and its PC software.

The information center is different things to different users and companies. Although it will be many years before users will no longer have to rely on the DP center, with the aid of software from a multitude of vendors, individuals will have greater ability to satisfy their own information needs. (IN)

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March 1980

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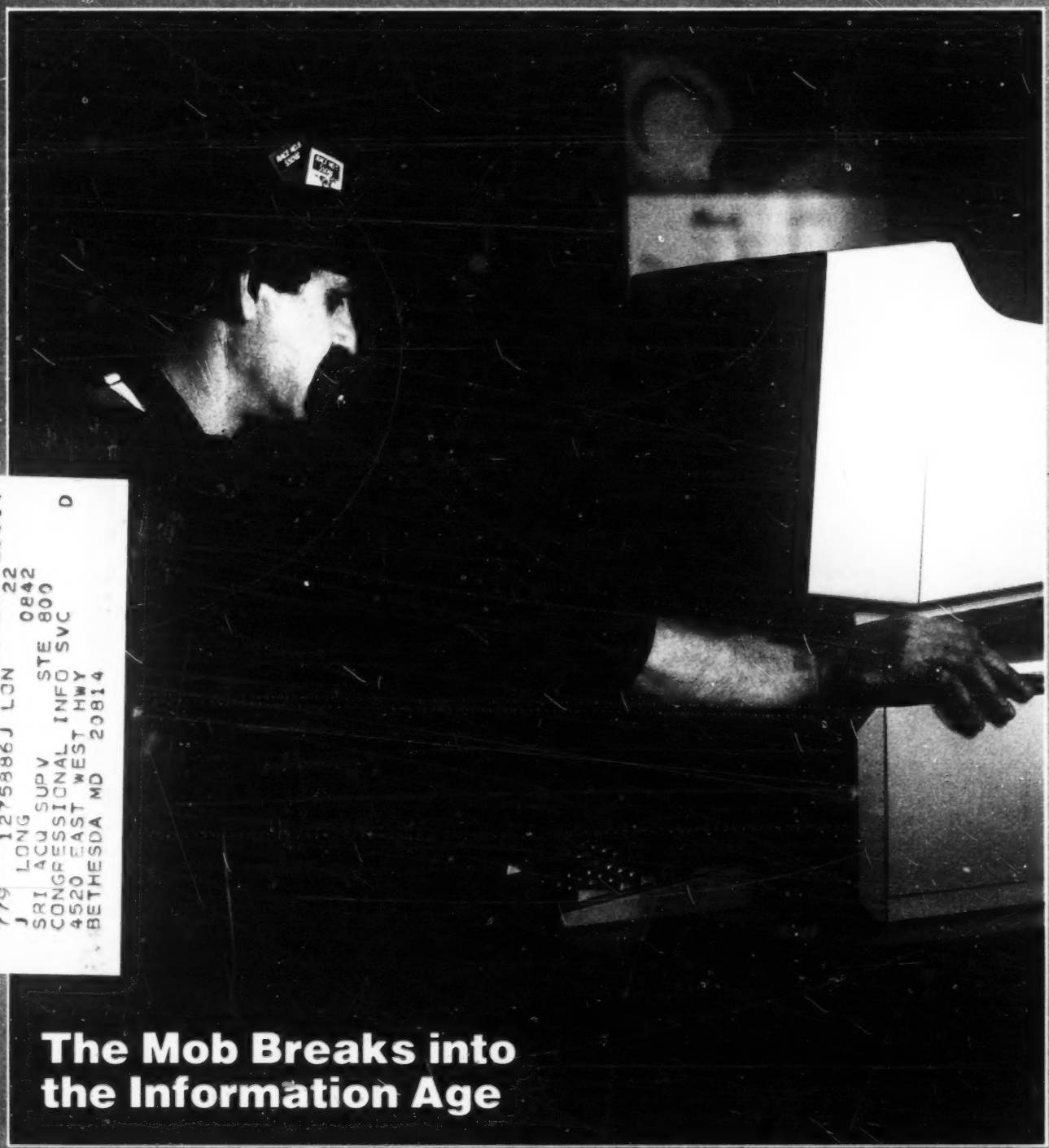

The Mob Breaks into the Information Age

ISSN 0364-5533

INFOSYSTEMS

THE MAGAZINE FOR INFORMATION SYSTEMS MANAGEMENT

March 1986 Volume 33 Number 3

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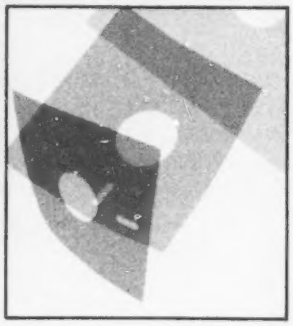

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3rd Annual Datacomm Usage Survey

In Search of Datacomm Expertise

Lack of trained staff, varied equipment choices, and the 'vendor gap' pose management problems as firms grow into data communications.

By Chuck Cozette
Associate Editor
and Ray Winkler
Manager,
Market Research

The increasing importance of data communications is forcing a fundamental restructuring in management information systems (MIS)—and raising a desperate cry for datacomm expertise.

As business priorities continue to require greater computer connectivity, datacomm is gradually attaining a peer relationship with its older, more established sibling, data processing (DP). As a result, information systems is becoming a two-pronged effort. In larger companies, increasingly this means separate managers for each function and a senior executive overseeing the entire MIS operation. In smaller firms unable to afford the luxury of additional management, many DP managers still do double-duty.

These observations are based on INFOSYSTEMS' third annual Datacomm Usage Survey. The study, conducted in January by Hitchcock Research Services of Wheaton, IL, was mailed to 4,000 MIS management-related individuals within a broad cross-section of industries across the country. Replies were received from 1,071 recipients for a return rate of 27 percent.

Although only 13 percent of all companies responding to the survey have separate datacomm managers, that number rises to 24 percent among companies with 1,000 or more employees. In the heavily communications-dependent banking and transporation industries, about 30 percent of those surveyed have datacomm managers.

In companies with datacomm managers, more than half report to an MIS executive, according to the study. In companies with more than 500 employees and no separate datacomm expert, the MIS manager assumes direct datacomm control 40 percent of the time. In businesses with 500 or fewer employees, however, datacomm responsibility is handled by the DP manager in about 45 percent of the firms surveyed.

Judging by respondent comments, some of these dual DP/datacomm managers are drowning under the complexities of their combined responsibilities. "Currently, we are understaffed so that all communications (voice/data), along with any computer-related problems, are handled by me," comments one respondent. "These areas need more people to dedicate themselves totally to either computers or communications. In short, we need to develop a separate communications department to devote the needed time towards making things work properly."

Regardless of how responsibilities are delegated, datacomm expertise is at a premium. Lack of trained staff and/or technical knowledge were among the most oft-cited problems of those surveyed. Summarizes another respondent, "This is a new area for us, and we are having to learn the hard way how to do things."

Users claim they are not the only ones in need of datacomm know-how. Many of those surveyed pointed an accusatory finger at vendors as well. "Most vendor representatives do not know how to reasonably communicate or actually integrate their products into a communications network," claims one user. Adds another, "No one understands fully the big picture, only their individual part."

Even more scarce than a vendor with datacomm knowledge is one who is willing to take blame when a system has problems, according to survey comments. Users long for a few dependable

Types of Data Communications Systems Being Used

	Presently Have		Don't Have Now But Plan to Add In Next 12 Months		Total that Have or Plan to Add In Next 12 Months	
	No.	Percent	No.	Percent	No.	Percent
Local Systems (on-site, campus)	862	81%	65	6%	927	87%
Metropolitan Area Systems	311	29%	77	7%	388	36%
Long Distance Systems	605	57%	98	9%	703	66%
Total-One or More Systems	1,030	96%	196	18%	1,056	99%
Total Respondents	1,071	100%	1,071	100%	1,071	100%

suppliers that will subscribe to Harry Truman's "the buck stops here" philosophy of problem-solving. "There are too many manufacturers," complains one respondent. "It's hard to tell which equipment will best serve our needs based on claims that sometimes are not entirely true."

Compatibility is another issue that continues to raise the hackles of many users. Cutting to the heart of the problem, one individual points to the "vendor gap between what is technically feasible and what it really takes to get things working reliably."

Although many of these complaints are similar to those voiced in the survey a year ago, there is one notable difference. Last year, AT&T took the brunt of the criticism for problems throughout the communications sector. This year, complaints were far more generic and the telecomm giant was seldom singled out as a particular source of difficulty.

Despite the negative tenor of their comments, many survey respondents still plan to expand datacomm facilities. These plans appear to be tempered, however, by residual effects of the general computer slump of the past 18 months.

Local systems remain the highest priority, with 43 percent planning on expanding either "moderately" or "substantially," according to the study. This is down from the 53 percent that planned similar expansion last year. One third of those surveyed expect growth in long distance systems, but that number is down 20 percent from a year ago. Metropolitan area systems are expected to suffer the greatest growth stagnation, as only 19 percent of respondents plan to expand in this area, compared to 52 percent in 1985.

The concept of integrating voice and data communications continues to generate a significant amount of interest but few tangible results. For the second consecutive year, almost a third of those surveyed plan moderate to extensive voice/data integration activity. But the percentage of companies with existing voice/data systems remained a paltry two percent. The insurance industry is an exception, however, with almost eight percent reporting integrated systems in place.

The survey also indicates a reduction in the planned purchase of individual products and services. Of the 17 products and services listed, only two show signs of measurably higher growth than last year—local area networks (LANs) and network management systems. Thirty-five percent of survey respondents plan to add LANs in the next 12 months and 21 percent expect to implement network management systems, both up four percent from last year.

That is not to say other products will not be purchased in significant numbers. Micro-to-mainframe links, for example, still top the list of planned purchases for the next 12 months. Forty-three percent of those surveyed say they will buy such links. But this anticipated growth is down 12 percent from last year, exactly reflecting the percentage increase in the

Products and Services

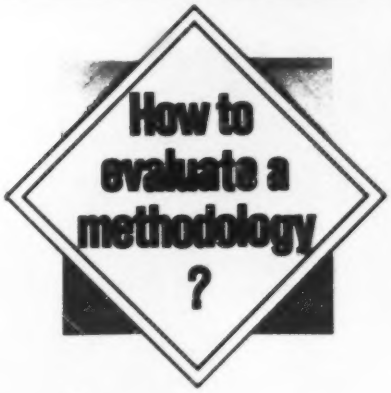
	Presently Use	Plan to Add in Next 12 Months
Terminals	92%	30%
Modems	92%	30%
Printers	92%	26%
Microcomputers	82%	27%
Communications software	72%	23%
Micro-to-mainframe links	56%	43%
Private line	52%	16%
Communications processors	49%	16%
Multiplexors	49%	20%
PBX's: Voice	45%	7%
Carriers (common value-added packet switching)	45%	14%
Converters (protocol interface, etc.)	43%	21%
Diagnostic and test equipment	31%	16%
Local area networks	30%	35%
Network management systems	22%	21%
PBX's: Voice and data	15%	19%
PBX's: Data	13%	10%
Base	1,028	544
	100%	100%

Number of Respondents by Job Title

	No. of Respondents	Percent
DP/MIS Operations		
DP/MIS Management	726	68%
DP/MIS Supervisory	85	8%
DP/MIS Staff	53	5%
Sub-Total	864	81%
Company Management		
General and Corporate Mgmt.	76	7%
Financial Management	58	5%
Administrative Services Mgmt.	62	6%
All Other	11	1%
Sub-Total	207	19%
Total Respondents	1,071	100%

Expansion Plans by Present Users (Next 12 Months)

	Local Systems	Metropolitan Area Systems	Long Distance Systems
Base: Presently Have System	1,030 100%	331 100%	605 100%
Will expand moderately	34%	15%	26%
Will expand substantially	9%	4%	8%
Will change or replace present systems	9%	2%	6%
No changes planned	48%	79%	60%



Are you grappling with high maintenance costs and a long backlog of requests? If the answer is yes, you're probably already investigating some possible solutions.

The articles and books you read may tell you that a systems development methodology can solve your problems, but when it comes to recommending which one, confusion reigns.

How do you evaluate the myriad of methodologies available and select the one that will meet your needs?

"How To Evaluate a Methodology," published by Ken Orr & Associates, Inc., may provide the answer. Based on our current research and more than a decade of experience with systems development, "How To" is a straight-forward set of questions that you need to include in your selection process.

These questions will help you to see the distinctions between methodologies, detect their strengths and weaknessess and, ultimately, discover which one will help you accomplish your goals.

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3rd Annual Datacomm Usage Survey

number of links installed. Forty-four percent of survey respondents had links installed last year; 56 percent, this year.

Three products that appear to be approaching a saturation point are terminals, modems and printers. More than 90 percent of respondents presently use such equipment. As a result, estimates of purchasing for this year, while still strong, are showing signs of leveling off. Microcomputers, in use at 80 percent of the companies surveyed, would appear to be following a similar pattern. Future purchases of these products are likely to depend increasingly on the vendors' ability to provide added value or specific niche functionality.

Who Has Responsibility for Data Communications

Data Processing Manager	40%
Director of Information Systems (MIS)	32%
Data Communications Manager	14%
Other	18%
Base	1,010
	100%

Person to Whom Data Communications Manager Reports

Director of Information Systems (MIS)	55%
Data Processing Manager	19%
Other	27%
Base	141
	100%

Role in the Specification or Purchase of Data Communications Equipment and Services

Advise and consult	68%
Determine the need	72%
Recommend type of equipment or supplier	63%
Specify type of equipment or supplier	56%
Approve the purchase	38%
Not involved	4%
Base	1,058
	100%

Even though MIS managers are the ones who typically oversee the implementation and operation of datacomm equipment, most do not have authority to approve final equipment purchases. MIS has the final say in only 38 percent of the organizations surveyed. The MIS manager does, however, play a strong supporting role: 68 percent serve as an advisor, while 63 percent recommend, and 55 percent specify, the type of equipment or supplier.

A wide spectrum of other individuals and departments have varying degrees of input into purchasing decisions, ranging from the inconsequential to the dictatorial. One respondent claimed his company's president had only a two percent say in the final purchase decision, while another company's executive committee was credited with even less (one percent) input. A number of other firms, however, reported owners, presidents and chief operating officers wielding 100 percent control over datacomm purchasing.

Key factors influencing purchasing decisions have remained virtually the same over the three years of the survey. Maximizing uptime continued to be the highest priority, as users ranked product reliability as the most important single factor in determining a purchase. On a scale of 10, reliability was given a 9.3 rating. Coming in a close second was product performance with a 9.2 score, followed by availability and speed of repair service (8.8), the vendor's reputation for high quality products (8.2), and compatibility with installed systems (8.2). Conspicuous in its absence from the top of this priority list is price, which ranked 10th out of the 12 factors. It was, in fact, the only factor that many respondents didn't rank at all.

The reason that price ranks low among factors affecting a purchase was clearly summed up by one respondent who apparently learned the hard way. "You get what you pay for," the person wrote. "We have on occasion tried to save a few dollars and paid the price in uptime and reliability." (N)

For an extra copy of this article, please enter No. 16 on the Reader Information Card.

Complete Datacomm Survey

A complete copy of the INFOSYSTEMS 1986 Datacomm Usage Survey is available for $295. The report includes a detailed breakdown of survey questions by job function, industry and company size. Check or money order must accompany all orders. Mail requests to Datacomm Survey, Research Department, Hitchcock Publishing, 25W550 Geneva Road, Wheaton, IL 60188.

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May 1986

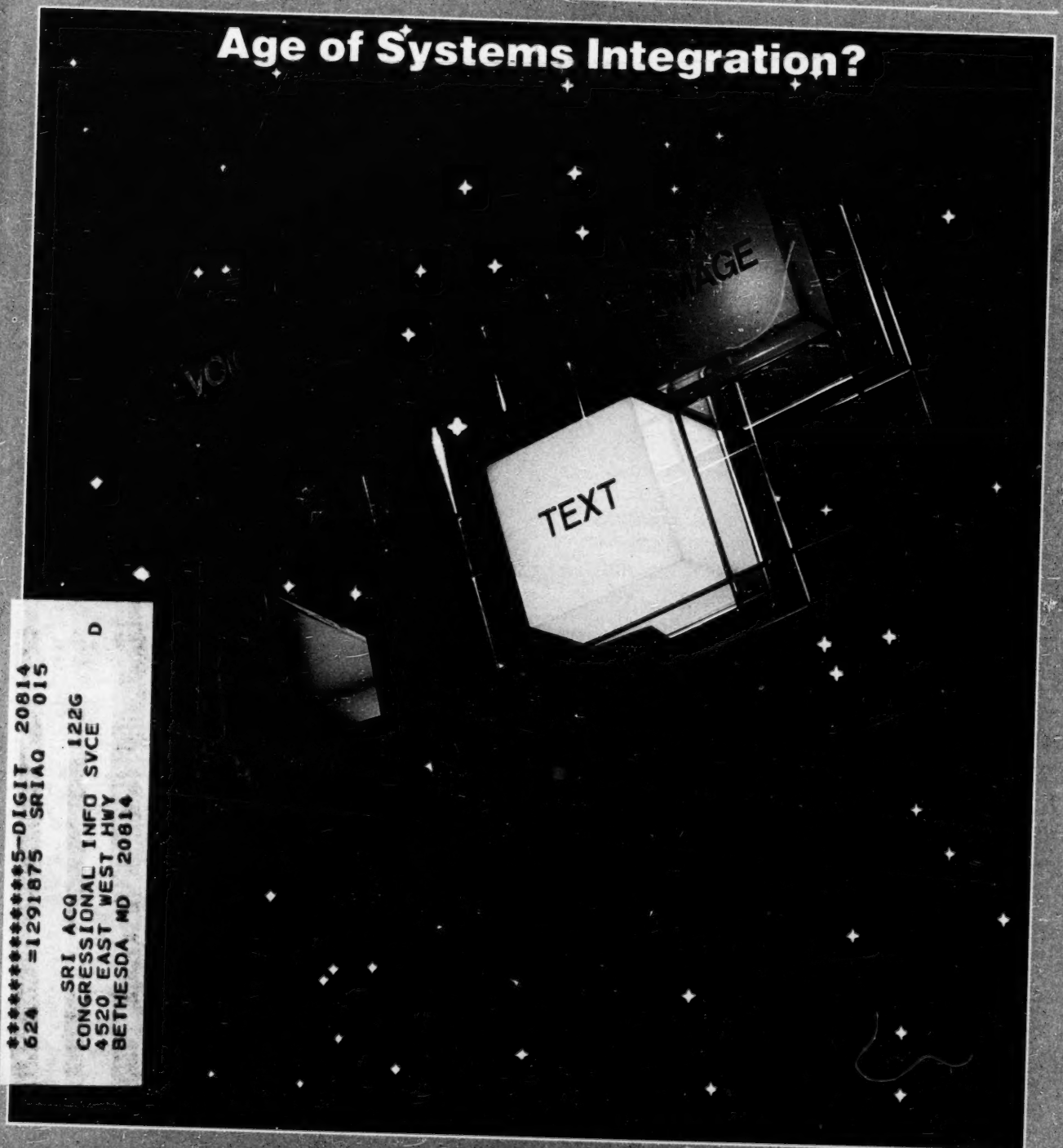
INFOSYSTEMS

Micro-to-Mainframe Links • Voice Recognition Systems

16th Annual Micrographics Usage Survey

Software Licensing • Telecommunications Management

Age of Systems Integration?



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ISSN 0364-5533

INFOSYSTEMS

THE MAGAZINE FOR INFORMATION SYSTEMS MANAGEMENT

May 1986 Volume 33 Number 5

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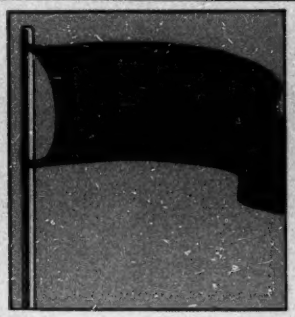

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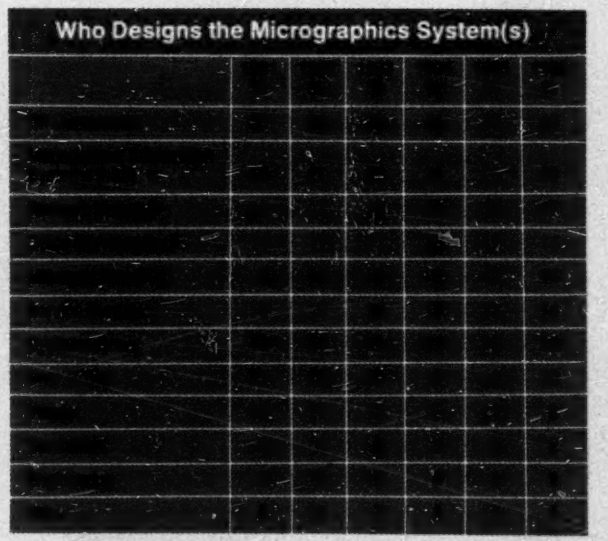
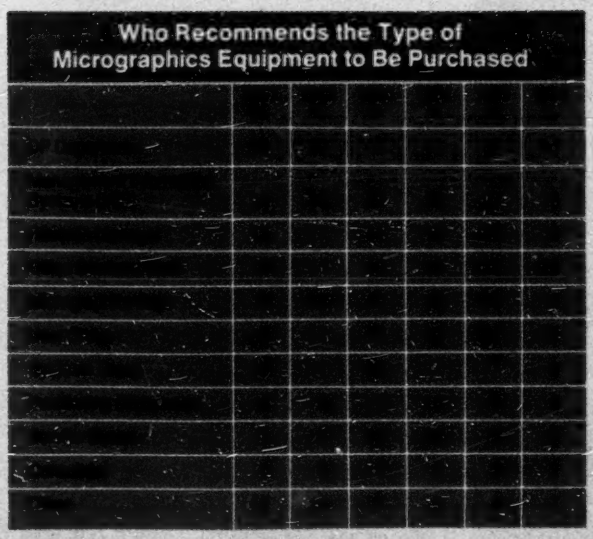
16th Annual Micrographics Usage Survey

Battling an Image Problem

Many of those who use it seem to be uncertain about what 'micrographics' means.

By Chuck Cozette, Associate Editor





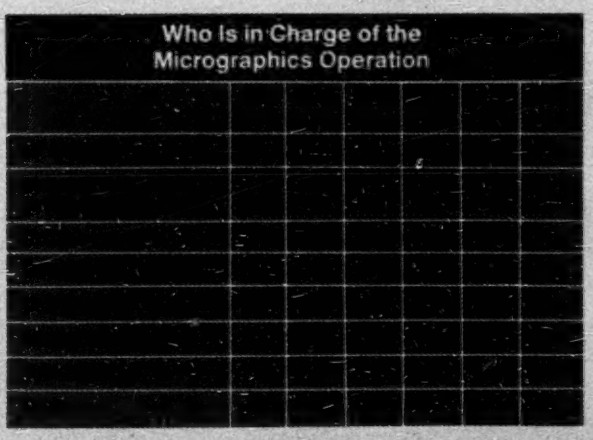
The slowdown in the computer industry and confusion surrounding the various types of document storage have combined to stunt growth in micrographics usage.

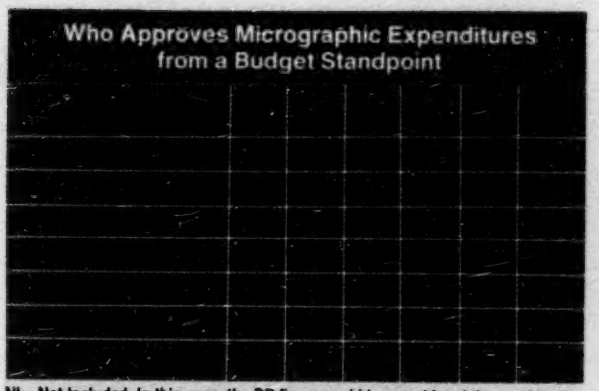
That is one of the key findings of INFOSYSTEMS' 16th Annual Micrographics Usage Survey, which showed spending by the average user declining slightly from $75,000 in 1984 to $71,000 this past year. Anticipated spending for the coming year also is down from the $91,000 that was expected to be spent last year, to the $77,000 planned for the coming year.

Although 41 percent of those not currently using micrographics claim they will evaluate its potential use in the next year, only 15 percent actually expect to implement a system or begin using a micrographics service bureau. Of those currently using micrographics, the majority foresee little growth. Two thirds say they will simply maintain or replace existing systems.

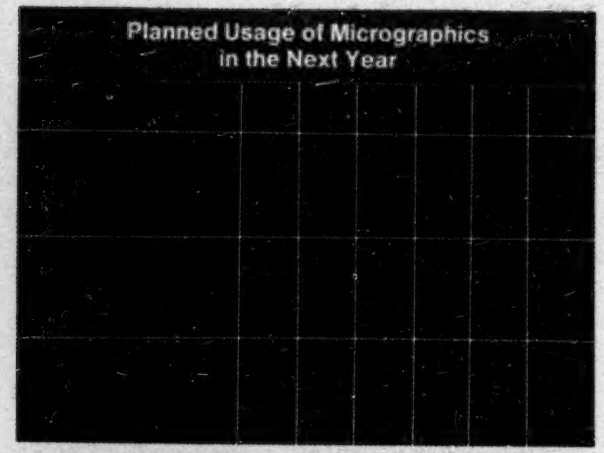
While decreases in micrographics spending are similar to those in other segments of the computer industry, the computer slump is not the only reason micrographics usage is stagnant. Part of the problem revolves around persistent confusion as to what micrographics really is.

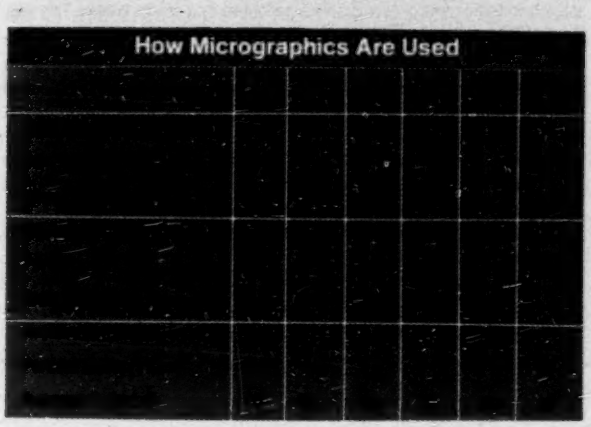
Given the growth of microcomputer use, persons new to the term often mistake micrographics for charts and graphs produced on a small computer. People oriented to the rapid rise of personal computers over the past half dozen years have inadvertantly picked up the word "micro" for small and attached it

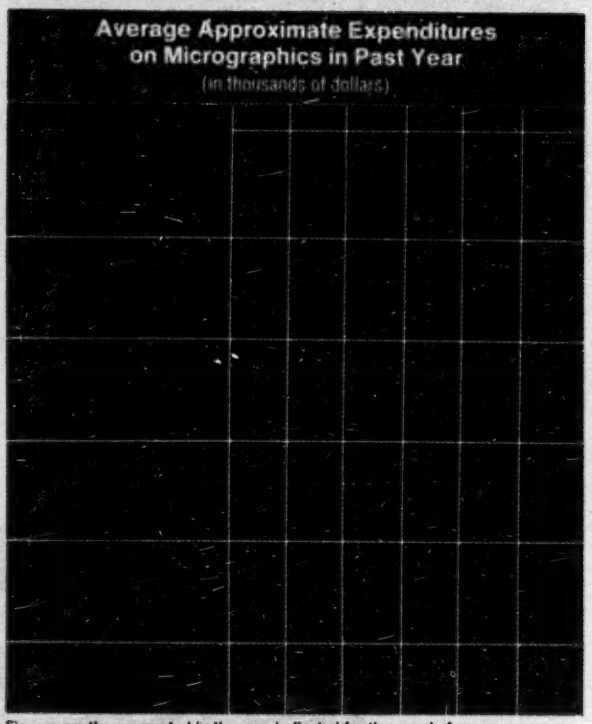




NI—Not Included. In this case, the DP figure could be considered the combination of DP and MIS.







Figures are those reported in the year indicated for the year before.

to "graphics" for charts. But micrographics meaning microfilm/microforms dates to about 1969.

Some within the industry have sought to address this problem by renaming the micrographics function "image management." Such a name change might help confused outsiders, but the roots of the problem extend much deeper.

"Even some people who are using micrographics are unsure as to what it includes," claims Ray Winkler, manager of market research at Hitchcock Marketing & Research Services, Wheaton, IL, which conducted the annual survey.

So just what is micrographics? As defined by INFOSYSTEMS' survey, micrographics is "an all-encompassing term generally accepted to include the creation and usage of all types of microforms and micro-images such as microfilm, microfiche and computer-output microfilm (COM)."

Six thousand surveys mailed drew 1,403 responses—a 23 percent return. Unlike past years, in which the study was sent to a random sampling of people in data processing operations, this year's survey was targeted to individuals previously indicating an involvement in purchasing microfilm/microfiche equipment.

Despite targeting the sample, only 67 percent of those responding indicated they use micrographics. While this was 30 percentage points higher than for the previous year's untargeted sample, Winkler believes actual usage is more extensive than either figure indicates.

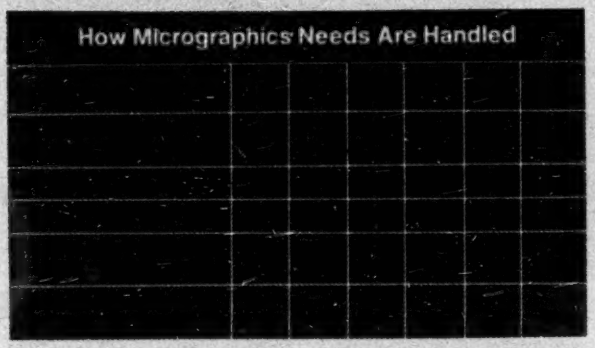
"Those who strictly use an outside service organization sometimes don't consider themselves to be using micrographics," explains Winkler. "Some use microfilm or fiche, but say they aren't using micrographics. And still others are unversed in the newer forms of micrographics."

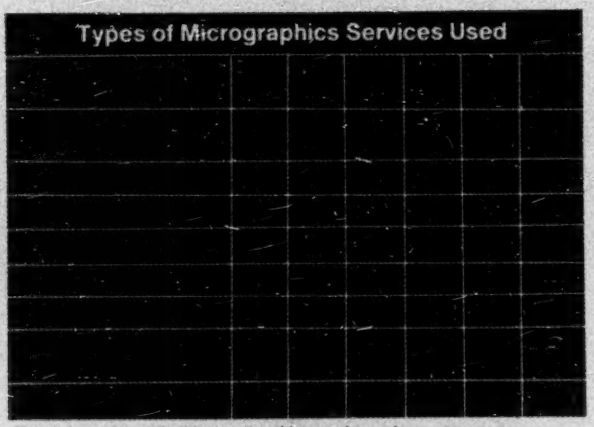
The most promising "newer form" of micrographics is optical disks, used to store digitized images. Although the survey did not specifically ask about optical disk usage, other industry surveys indicate a measurable, albeit gradual, increase. High price and lack of compatibility with existing systems seem to be the biggest drawbacks (For more information on optical storage, see "Merging Micrographics and MIS" in this issue).

Even when people understand the essence of micrographics, there is disagreement on its usefulness. One survey respondent writes, "Everyone should use it." Counters another, "I think the field is dying." A third respondent says, "Our computer-aided retrieval system is the best thing since sliced bread!" Still another respondent predicts, "Laser technology should obsolete micrographics by 1990."

For most, micrographics usage is strictly a matter of the bottom line. "We were previously doing a large amount of microfilming," summarizes one respondent, "but have cut back

16th Annual Micrographics Usage Survey





*There was a change in this question this year. In previous years, users were asked to indicate types of micrographics performed by a service bureau. This year the question just asked what types of micrographics are used.

greatly since a study showed microfilm labor cost exceeded value of paper space saved and other benefits."

For those who do find micrographics to be cost effective, more than half handle most or all of their needs through service bureaus. Twenty-three percent do everything in-house. Although 12 percent plan to do a larger share in-house in the next year, the vast majority (82 percent) expect little or no change in their handling of micrographics.

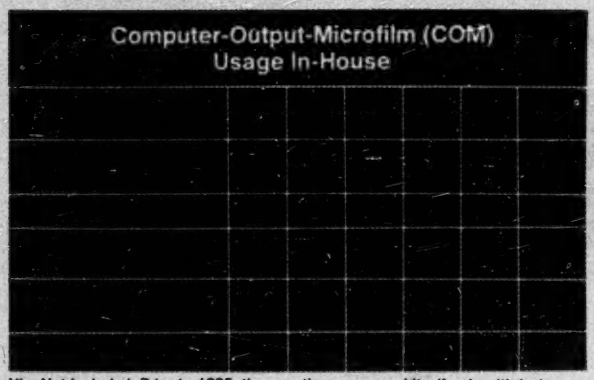
Banks are the biggest users, with 93 percent of those responding claiming to use some form of micrographics. Utility and communications (84 percent), insurance (80 percent) and finance (78 percent) companies are also extensive users.

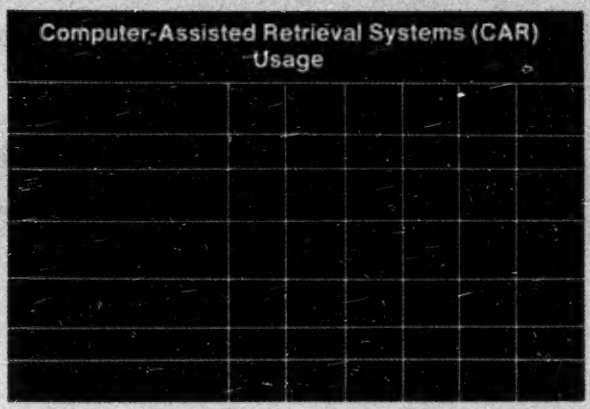
The primary function of micrographics, representing almost half of all usage, continues to be archival storage. Almost a third of the images stored by micrographics are referenced on a daily basis, the remaining 23 percent are "semiactively referenced," according to the survey.

COM continues to show steady but gradual growth. The number of respondents using COM through a service bureau rose slightly from 56 percent last year to 58 percent this year. In-house COM usage showed a more significant increase, from 17 percent to 22 percent.

Usage of computer assisted retrieval (CAR) also has risen in recent years. Only seven percent of survey respondents used CAR in 1981 compared to 16 percent this year.

Now a laser printer with a price that's fit to print.





NI—Not included. Prior to 1985, the question concerned itself only with in-house usage.

Those not using micrographics tend to be find themselves at one of two technological extremes. On the one hand, a small number of respondents commented that they are using optical disk technology to store documents digitally. A far greater number, however, continue to use various forms of hardcopy files.

Writes one respondent, "It's hard to sell users on the idea (of micrographics)—they like paper." Another company reports having an office or department of "paperwork management."

For those companies that have made the move from paper to film and fiche, operational responsibility for the micrographics function typically rests with data processing or management information systems. The DP department is in charge of micrographics 45 percent of the time; MIS, 32 percent.

DP/MIS are also at the forefront in both system design and equipment recommendation, according to the survey. When it comes down to final approval for micrographic expenditures, however, executive and financial management continue to have the final say.

Complete Reports Available

Complete spiral-bound copies of the backup summary of the 16th Annual Micragraphics Usage Survey are available for $50. This summary includes a detailed breakdown, by industry, for each of the survey's 18 questions. Check or company purchase order must accompany all orders. Mail request to INFOSYSTEMS Micrographics Survey, Research Department, Hitchcock Publishing Co., 25W550 Geneva Road, Wheaton, IL 60188.

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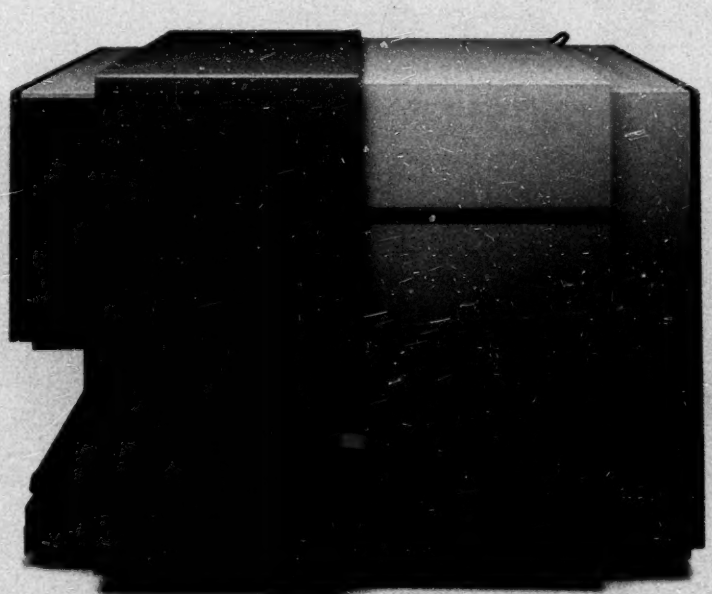

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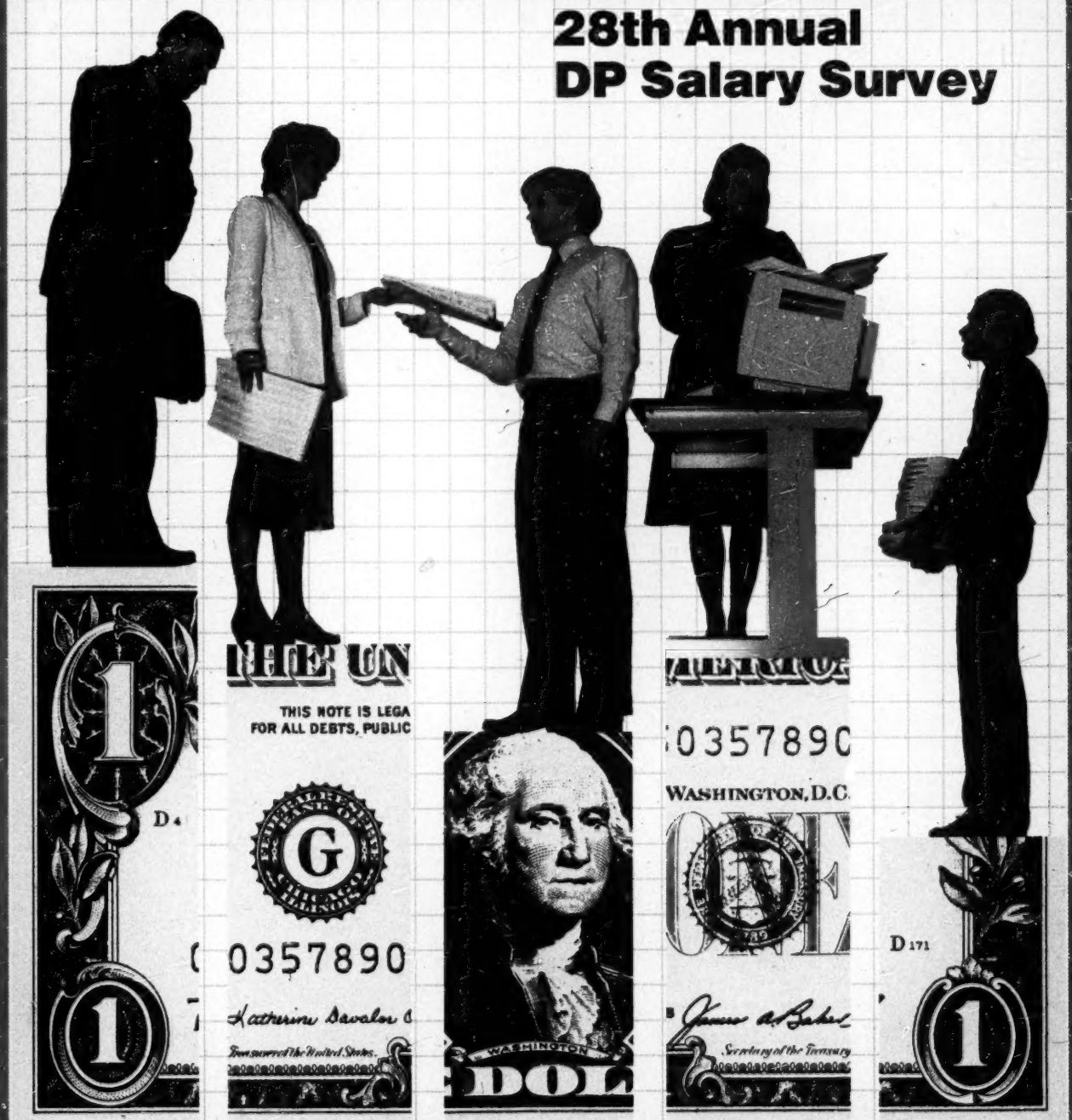
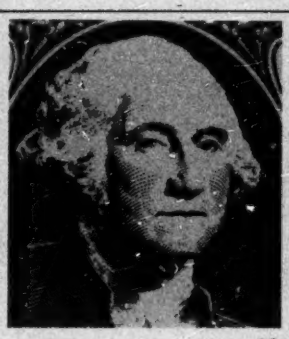


INFOSYSTEMS

THE MAGAZINE FOR INFORMATION SYSTEMS MANAGEMENT

ISSN 0364-5533

June 1986 Volume 33 Number 6 Part 1



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The World Is Flat

There has been a minimal increase in DP salaries this year although some functions reported impressive gains.

By Wayne L. Rhodes Jr., Editor

Respondents to INFOSYSTEMS' 28th Annual Data Processing (DP) Salary Survey reported an overall increase this year of less than one percent. That ends a four-year run of steadily increasing salary hikes.

The overall results of the 1986 survey, however, do not mean that salary increases were nominal for all jobs. Managers of data communications, applications programming and systems analysis/programming all recorded significant, double-digit increases. So did tape librarians, input/output control managers in computer operations, and senior and junior data entry operators.

For some other positions—notably data base systems manager, systems programming trainer and project team leader—salaries fell significantly from previous year levels.

According to Ray Winkler, director of research at Hitchcock Research Services, Wheaton, IL, which conducted the survey, the drop in salaries probably indicates that people moved out of the jobs and were replaced with lower-salaried individuals. He believes the unusually low increase in salaries probably reflects a number of variables, not the least of which is last year's relatively low inflation rate in the economy.

Winkler also points out that the biggest winner in the 1985 survey, the data base systems manager, was among the biggest losers this year. The same holds true in the area of systems analysis.

The 0.6 percent increase this year is in marked contrast to last year when INFOSYSTEMS' reported a 7.9 increase in salaries, the largest in five years. This year's results were the first drop in the size of DP raises since a dramatic change after the double-digit increase of 12.8 percent in 1981.

The biggest winner in this year's survey is the data communications manager. Survey respondents reported the average annual salary had gone up from $32,136 to $40,248—a 25 percent increase. The recent emphasis on communications, including the incipient signs of a merger between telecommunications and data communications, could account in part for the sudden surge in the remuneration of this position.

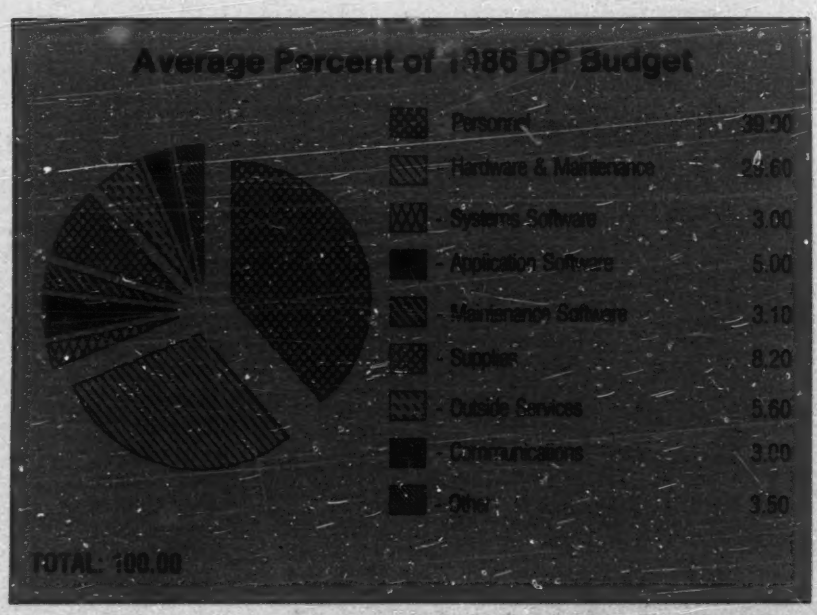
In striking contrast, however, the second place finisher is an old timer: the tape librarian. The salaries reported for this job went from $15,444 per year up to $17,992. That's a 16.5 percent raise.

The biggest loser was the systems programming trainer, whose salary dropped from $24,232 per year to $19,500, a 19.5 percent decline. Probably more significant, however, is that three of the four systems analysis positions received lower salaries in 1986 than in 1985. The manager/supervisor of systems analysis had the second largest drop in salary from $44,668 to $39,000 yearly—a 12.7 percent decrease. The lead and junior systems analysts' salaries dropped and the senior analyst had only a small gain.

The salary survey results are based on more than 6,000 jobs reported from readers at 681 organizations drawn from INFOSYSTEMS' subscriber list. The respondents represent a cross section of those subscribers in terms of location, primary activity at the location, and size of organization. Salaries are based on those in effect as of March 1 this year. Bonuses and other benefits are not included in the salaries.

Nearly 38 percent of the respondents reported at least one mainframe computer at their locations; 80 percent reported having a minicomputer; and 81.5 percent said they have a microcomputer. An average of 1.5 mainframe computers was reported for each location, with the low being one and the high being 25. An average of 4.4 minicomputers was reported and an average of 32.9 microcomputers. The number of microcomputers at a location ranged from one to 995.

The size of the data processing organizations surveyed ranged from one person to more than 200. DP employees make up 2.7 percent of the workforce of their organizations, the highest percentage ever reported by the survey in this cate-



gory. Eight years ago, for example, the figure was 1.3 percent; last year it was 1.9.

Sixty-three percent of the respondents said that their DP organizations have remained about the same size. Twenty-one percent said they had increased in size, and 16 percent said they had decreased.

For the first time since information was collected on the breakdown of the data processing budget, personnel expenses fell below 40 percent of the total. In the two previous years, they were reported at 42.5 and 42 percent, respectively, of the DP budget. Historically, personnel costs have consumed between 40 and 45 percent of the budget. This year they dropped slightly, to 39 percent.

The highest salary reported for the top management information systems (MIS) official was $150,000 per year. That salary, however, is for the president of a DP service bureau. The largest salary reported for the head of an internal MIS organization was $115,000, for a vice president of information resources. A vice president of MIS and an MIS executive director each reported salaries of $100,000.

Geographically, the Mid Atlantic states of New York, Pennsylvania and New Jersey reported the highest salaries in virtually every job classification. For example, the top MIS official in that region averages $73,476 annually versus the $39,312 salary reported for the East South Central region comprising Kentucky, Tennessee, Mississippi and Alabama.

The chemical and energy industries reported the highest salaries almost across the board. The top MIS official in that field averages $63,336. No clear pattern appeared as to what fields consistently paid less than any others. For example, the lowest reported average salary for the top MIS official, $41,912, was in the manufacture of machinery, instruments and equipment. But salaries for other DP functions in that area appear fairly competitive with those in other fields.

Turnover seems to be a constant in data processing. Nearly 54 percent of the respondents said they have new employees. The number of new employees was 13.5 percent of total DP employment. That is down from last year when 15.3 percent of employees were reported as new and nearly 60 percent of organizations reported changes.

Compounding the turnover situation, almost a quarter of the repondents said they have one or more unfilled salaried, nonclerical DP positions. The average number of unfilled positions is 2.3. The survey reported that the average number of vacant positions last year was 3.3. Filling those vacant positions probably contributed to the increase in the number of DP employees in the workforce.

Salary Breakouts

A comprehensive breakout of salary information can be found in chart form on the following pages. The breakout is by geographic area, by size of installation and by industry. (N)

Number of Employees in DP vs. Company

(By equipment rental range)

Rental range Per month	Average Number in DP	Average Number in Company
[illegible] $3,000	3.0	164.6
$3,000 to $4,499	4.5	208.5
$4,500 to $5,999	4.8	149.7
$6,000 to $8,999	6.0	290.8
$9,000 to $11,999	6.5	297.6
$12,000 to $14,999	8	387.3
$15,000 to $17,999	9.5	328.0
$18,000 to $24,999	14.1	527.1
$25,000 to $49,999	19.9	943.0
$50,000 to $74,999	31.0	1205.3
$75,000 to $99,999	52.2	1149.2
$100,000 to $149,999	139.7	1813.8
$150,000 and over	199.7	5491.8
Not available	7.9	331.8
All companies	18.3	804.6

Complete DP Salary Survey

A complete copy of INFOSYSTEMS' 1986 DP Salary Survey can be ordered for $50. The report includes replies to the 18 questions in the study by industry and equipment rental range, as well as salary data for the 41 job functions. Send check or company purchase order to Hitchcock Executive Book Service, Hitchcock Building, 25W550 Geneva Road, Wheaton, IL 60188.

Job Descriptions Available

Detailed job descriptions for the 41 DP positions surveyed are available free of charge. For a copy, enter No. 12 on the Reader Information Card.

Reprints of this article, including all charts, are available from Hitchcock Executive Book Service for $7.50 each.

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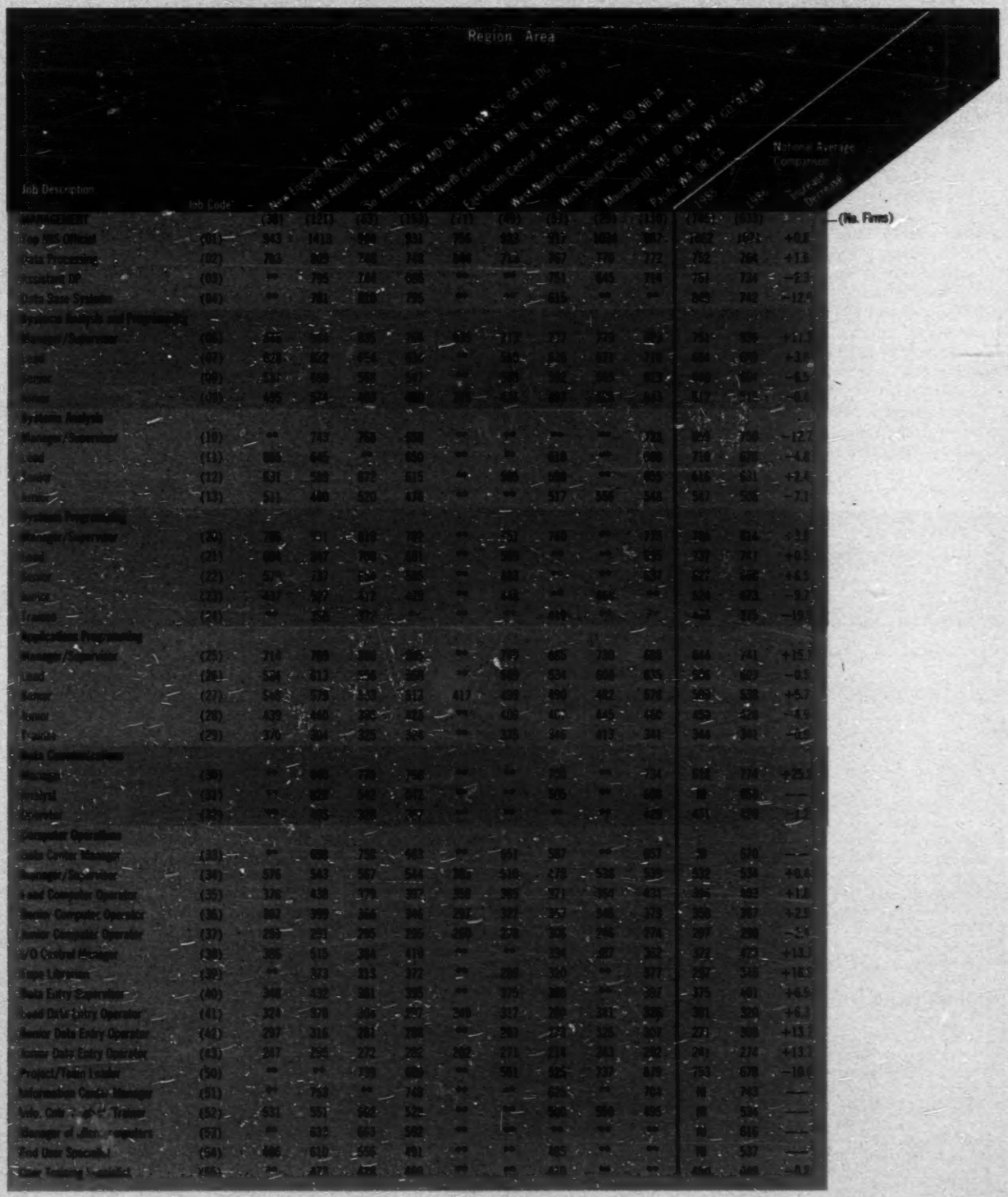
28th Annual DP Salary Survey

Average Reported Weekly Salaries by Geographic Area



NI = Not Included **Indicates Insufficient Information available

28th Annual DP Salary Survey

Weekly Salaries for All Jobs: Nationwide and by Size of Installation

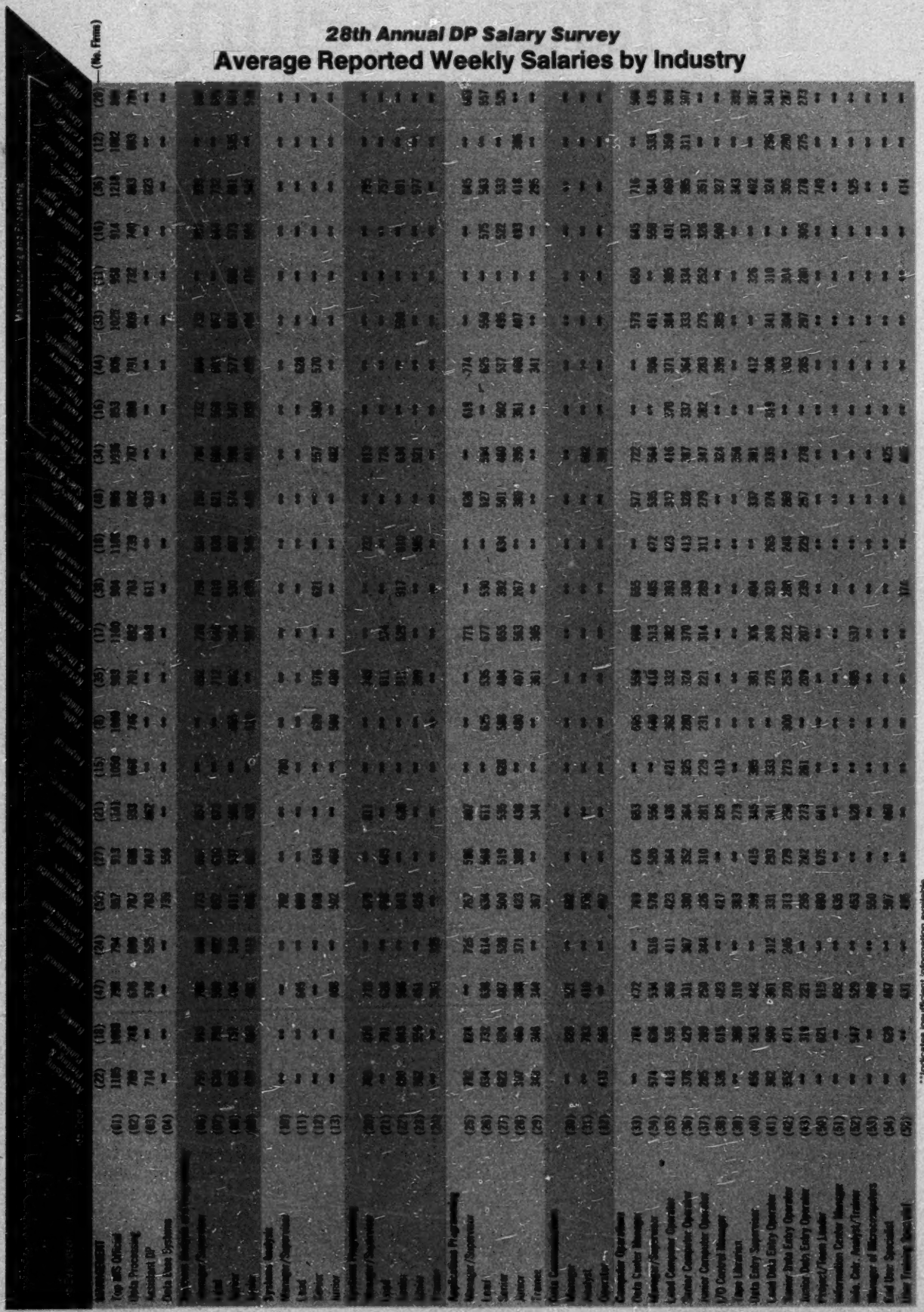
—(No. Firms)

Job Description	Job Code*	NATIONAL STATISTICS: Number Reported	Lowest Reported Actual Salary	25th Percentile* Actual Salary	National Average Actual Salary	Median* Actual Salary	Mode* Actual Salary	75th Percentile* Actual Salary	Highest Reported Actual Salary	Established Salary Ranges—Average Low	Established Salary Ranges—Average High	AVERAGE SALARY—BY EQUIPMENT RENTAL RANGE: Under $1,000/Mo	$1,000-$1,499/Mo	$1,500-$1,999/Mo	$2,000-$2,499/Mo	$2,500-$2,999/Mo	$3,000-$3,499/Mo	$3,500-$3,999/Mo	$4,000-$4,999/Mo	$5,000-$5,999/Mo	$6,000-$7,499/Mo	$7,500-$9,999/Mo	$10,000-$14,999/Mo	$15,000 and over
MANAGEMENT												(79)	(70)	(48)	(80)	(54)	(54)	(32)	(48)	(55)	(26)	(14)	(12)	(20)
Top MIS Official	(01)	208	230	848	1071	1000	1057	1136	2404	852	1204	711	799	772	838	983	889	974	988	1068	1154	1159	1208	1225
Data Processing	(02)	406	300	645	764	761	805	865	1680	647	893	624	678	704	750	754	709	812	813	899	956	861	976	911
Assistant DP	(03)	74	280	576	734	728	711	950	1250	583	831	**	605	558	566	710	692	728	708	746	864	750	870	835
Data Base Systems	(04)	26	330	576	742	700	700	884	1090	622	892	**	**	**	491	**	**	**	**	783	721	**	830	882
Systems Analysis and Programming																								
Manager/Supervisor	(08)	184	340	720	836	800	961	926	1761	695	901	686	647	**	643	792	784	897	808	829	876	893	840	1009
Lead	(07)	226	300	594	689	673	692	730	1345	560	767	517	629	566	611	667	629	613	692	677	675	776	741	811
Senior	(06)	497	230	521	604	600	673	673	1153	489	711	540	540	569	522	548	540	563	605	613	613	631	695	654
Junior	(09)	348	240	430	515	497	538	572	961	414	599	**	469	**	442	446	461	495	495	499	481	524	525	609
Systems Analysis																								
Manager/Supervisor	(10)	18	576	624	750	768	807	807	1153	630	850	**	**	**	**	**	**	**	768	787	**	795	**	801
Lead	(11)	31	310	586	676	675	676	775	965	569	806	**	**	**	**	**	**	**	**	738	647	766	725	821
Senior	(12)	78	385	565	631	636	673	673	865	521	742	**	**	**	632	593	635	**	646	655	623	632	682	557
Junior	(13)	35	336	450	508	498	461	576	680	452	647	**	**	**	**	548	575	**	**	523	580	549	565	502
Systems Programming																								
Manager/Supervisor	(20)	90	423	660	814	804	961	923	1352	648	981	**	**	**	**	577	**	**	704	732	806	775	950	1015
Lead	(21)	58	307	568	741	711	938	938	1250	550	850	**	**	**	**	557	**	**	613	698	696	718	725	920
Senior	(22)	98	384	550	668	653	653	735	1057	510	784	**	**	**	553	488	620	510	598	639	647	713	682	799
Junior	(23)	43	269	377	473	452	519	563	769	405	606	**	**	**	348	**	501	495	**	485	541	485	586	660
Trainee	(24)	16	173	320	375	381	320	470	514	346	511	**	**	**	**	**	**	**	**	**	**	**	411	**
Applications Programming																								
Manager/Supervisor	(25)	52	283	673	741	730	692	853	1044	622	939	621	663	600	**	**	**	**	733	786	725	852	827	884
Lead	(26)	100	207	507	603	600	673	673	968	492	726	470	614	588	598	558	591	590	663	607	585	654	668	675
Senior	(27)	322	298	476	538	527	519	596	846	453	647	395	560	585	491	489	553	467	491	556	530	497	520	560
Junior	(28)	250	200	385	428	423	480	480	730	364	528	390	455	**	369	431	393	403	461	412	446	413	437	500
Trainee	(29)	56	187	309	341	346	346	384	461	328	463	341	249	336	301	**	**	319	328	347	364	371	372	406
Data Communications																								
Manager	(30)	20	330	557	774	730	692	865	1538	683	943	**	**	**	**	**	**	**	**	868	**	885	**	925
Analyst	(31)	41	300	461	658	615	692	788	1346	501	740	**	**	**	**	**	**	**	**	568	692	596	**	798
Operator	(32)	86	180	343	436	413	346	480	673	342	497	287	**	**	**	**	**	**	380	374	393	**	330	534
Computer Operations																								
Data Center Manager	(33)	75	180	500	670	692	576	784	1153	584	841	381	466	**	**	482	**	558	682	739	784	723	823	898
Manager/Supervisor	(34)	182	225	423	534	538	538	606	1240	458	678	383	376	437	499	491	597	508	489	566	571	567	619	652
Lead Computer Operator	(35)	317	145	336	403	390	346	446	760	336	469	331	334	375	342	369	325	389	386	404	414	435	466	564
Senior Computer Operator	(36)	514	190	315	367	350	346	404	821	299	425	305	292	337	339	329	351	327	349	373	375	398	363	439
Junior Computer Operator	(37)	381	125	240	290	288	288	326	580	255	361	251	205	298	277	273	281	257	281	301	320	361	331	344
I/O Control Manager	(38)	57	225	325	423	401	480	504	573	346	506	380	**	229	**	**	**	**	357	373	394	356	471	605
Tape Librarian	(39)	54	211	288	346	327	288	390	526	277	392	**	**	**	**	**	**	331	358	318	322	328	357	386
Data Entry Supervisor	(40)	102	200	320	401	371	365	483	673	329	481	295	371	297	366	444	394	370	360	390	393	**	495	564
Lead Data Entry Operator	(41)	231	144	260	320	307	225	363	576	266	365	253	309	253	284	302	327	331	292	301	357	366	363	475
Senior Data Entry Operator	(42)	423	118	256	308	291	473	363	576	247	336	248	300	247	259	423	258	295	257	311	325	353	358	434
Junior Data Entry Operator	(43)	293	100	220	274	280	288	308	415	227	309	245	276	238	219	292	216	285	240	260	286	288	291	344
Project/Team Leader	(50)	37	400	625	678	678	730	730	900	615	861	**	**	**	**	**	**	**	**	647	707	**	765	764
Information Center Manager	(51)	20	384	653	743	719	730	865	1000	669	969	**	**	**	**	**	**	**	**	760	771	**	**	758
Info. Ctr. Analyst/Trainer	(52)	46	319	479	534	502	577	577	790	463	688	**	**	**	**	**	**	519	**	485	533	**	**	562
Manager of Microcomputers	(53)	16	346	500	616	557	596	730	1153	521	718	**	**	**	**	**	**	**	**	597	**	**	536	640
End User Specialist	(54)	48	230	425	537	485	461	609	961	458	663	**	**	**	**	495	**	**	453	454	493	621	535	723
User Training Specialist	(55)	21	288	361	449	436	375	552	730	449	588	**	**	**	**	**	**	**	**	459	463	**	**	616

*Median—A figure having an equal number above and below
*Mode—The salary reported most often
*25th Percentile—That point at which 25% of all other salaries are lower and 75% are higher
*75th Percentile—That point at which 75% of all other salaries are lower and 25% are higher
**Indicates insufficient information available

28th Annual DP Salary Survey

Average Reported Weekly Salaries by Industry



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